

What I claim is:

Sub. B1  
Sub. A  
Sub. C

1. A gel composite comprising one or more layers of a tear resistant, elastic insulating gel,  $G_n$ , formed from (I) 100 parts by weight of at least one or more a linear, multi-arm, branched, or star shaped high viscosity block copolymer, (II) about 300 to about 1,600 parts by weight of a plasticizing oil in combination with one or more layers of said gel formed from (I) and (II) and having (III) a selected amount of one or more heat expandable plastic or synthetic particulates of material forming a homogeneous or non-homogeneous closed cell particulate gel dispersion,  $(G_n M_m)$ , wherein said gel  $G_n$  having a gel rigidity of from about 20 to about 1,000 gram Bloom, said gel dispersion,  $(G_n M_m)$ , having a gel rigidity of from 50 to about 3,000 gram Bloom, and said gel and said gel dispersion having an elongation of at least 200%, said gel or gel,  $G_n$ , dispersion,  $(G_n M_m)$ , capable of being formed in adhering contact with or physically interlocked with a selected substrate material,  $M_n$ , to form one or more combinations of a gel-substrate, gel dispersion-substrate, or gel-substrate/gel dispersion composites including a sequential addition or permutation of said combinations of  $G_n G_n$ ,  $M_n G_n$ ,  $G_n M_n G_n$ ,  $M_n G_n M_n$ ,  $M_n G_n G_n$ ,  $M_n M_n G_n$ ,  $M_n G_n G_n G_n$ ,  $M_n M_n M_n G_n$ , including  $M_n G_n G_n M_n$ ,  $G_n M_n G_n M_n$ ,  $G_n G_n M_n G_n$ ,  $M_n G_n M_n M_n$ ,  $M_n G_n M_n G_n$ ,  $G_n M_n G_n G_n$ ,  $G_n M_n M_n G_n$ ,  $G_n G_n M_n M_n$ ,  $G_n M_n G_n M_n M_n$ ,  $G_n M_n G_n M_n G_n$ ,  $G_n M_n M_n G_n G_n$ ,  $G_n G_n G_n M_n M_n$ ,  $M_n G_n G_n M_n G_n$ ,  $M_n G_n M_n G_n M_n$ ,  $G_n G_n M_n M_n M_n$ ,  $G_n M_n M_n G_n M_n$ ,  $G_n G_n G_n M_n G_n G_n$ ,  $M_n G_n M_n G_n M_n G_n$ ,  $M_n M_n G_n G_n M_n M_n$ ,  $M_n G_n G_n M_n G_n M_n$ ,  $M_n G_n G_n M_n G_n G_n$ ,  $G_n M_n G_n M_n G_n M_n$ ,  $G_n M_n M_n G_n G_n M_n$ ,  $M_n G_n G_n M_n G_n M_n$ ,  $M_n M_n G_n G_n M_n M_n$ ,  $G(G_n M_m)$ ,  $(G_n M_m)(G_n M_m)$ ,  $(G_n M_m)G_n$ ,  $M_n(G_n M_m)$ ,  $M_n M_n(G_n M_m)$ ,  $M_n G_n G_n(G_n M_m)$ ,  $M_n M_n M_n(G_n M_m)$ , including  $M_n G_n(G_n M_m)$ ,  $(G_n M_m)G_n M_n$ ,  $G_n(G_n M_m)G_n$ ,  $M_n(G_n M_m)M_n$ ,  $M_n(G_n M_m)G_n$ ,  $(G_n M_m)G_n G_n$ ,  $(G_n M_m)M_n G_n$ ,  $G_n(G_n M_m)G_n M_n$ ,  $(G_n M_m)G_n M_n M_n$ ,  $(G_n M_m)G_n M_n G_n$ ,  $(G_n M_m)M_n G_n G_n$ ,  $G_n G_n(G_n M_m)M_n$ ,  $M_n G_n(G_n M_m)G_n$ ,  $M_n(G_n M_m)(G_n M_m)$ ,  $G_n(G_n M_m)M_n M_n$ ,  $(G_n M_m)M_n(G_n M_m)$ ,  $G_n G_n(G_n M_m)G_n G_n$ ,  $M_n(G_n M_m)(G_n M_m)G_n$ ,  $G_n(G_n M_m)M_n G_n$ ,  $G_n(G_n M_m)G_n$ ,  $(G_n M_m)(G_n M_m)(G_n M_m)$ ,  $(G_n M_m)M_n G_n(G_n M_m)$ ,  $M_n G_n(G_n M_m)(G_n M_m)$ ,  $G_n(G_n M_m)M_n G_n G_n$ ,  $M_n M_n G_n(G_n M_m)M_n$ ,  $M_n G_n(G_n M_m)(G_n M_m)$ ,  $M_n G_n(G_n M_m)G_n G_n$ ,  $G_n(G_n M_m)G_n(G_n M_m)$ ,  $(G_n M_m)(G_n M_m)G_n$ ,  $M_n M_n M_n(G_n M_m)M_n M_n$ ,  $M_n(G_n M_m)G_n(G_n M_m)$ ,  $M_n(G_n M_m)(G_n M_m)M_n G_n$ ,  $(G_n M_m)M_n(G_n M_m)M_n G_n$ ,  $M_n G_n(G_n M_m)G_n(G_n M_m)$ ,  $M_n G_n(G_n M_m)G_n(G_n M_m)$ ,  $(G_n M_m)(G_n M_m)(G_n M_m)G_n$ ,  $G_n(G_n M_m)M_n G_n(G_n M_m)M_n$ ,  $G_n(G_n M_m)G_n(G_n M_m)G_n G_n$ ,  $(G_n M_m)(G_n M_m)(G_n M_m)(G_n M_m)$ ,  $(G_n M_m)G_n(G_n M_m)G_n(G_n M_m)G_n$ ,  $G_n(G_n M_m)(G_n M_m)(G_n M_m)G_n G_n$ , or  $(G_n M_m)(G_n M_m)(G_n M_m)(G_n M_m)(G_n M_m)G_n$ , where when  $n$  is a subscript of  $G$ ,  $n$  denotes the same or different gel rigidity; where when  $n$  is a subscript of  $M$ ,  $n$  denotes the same or different material of foam, plastic, fabric, knit fabric, yarn knit fabric, metal, wood, glass fiber, ceramics, synthetic resin, synthetic fibers or refractory materials; where when  $m$  is the subscript of  $M$ ,  $m$  denotes the same or different microsphere of glass or thermoplastic resin; said composites formed of one or more gels or gel dispersion of the same or different gel rigidity and one or more substrates of the same or different material; said gel or gel dispersion formed with or without (IV) one or more of a selected polar polymer and in combination with or without (V) one or more of a selected crystalline or non-crystalline polymer or copolymer; said gel, said gel dispersion, or said composites when in direct contact with a part of human skin is capable of substantially preventing the generation of moisture from said part of skin.

2. A gel according to claim 1, wherein said (I) block copolymer is poly(styrene-ethylene-butylene-styrene), poly(styrene-ethylene-propylene-styrene), poly(styrene-

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ethylene/propylene-ethylene-ethylene/butylene)<sub>n</sub>, poly(styrene-ethylene-ethylene/propylene-ethylene-ethylene/propylene-ethylene/butylene)<sub>n</sub>, poly(styrene-ethylene-ethylene/propylene-ethylene-ethylene/propylene-ethylene)<sub>n</sub>, poly(styrene-ethylene-ethylene/propylene-ethylene/butylene-ethylene/propylene-ethylene/butylene-butylene)<sub>n</sub> or a mixture thereof.

3. A gel according to claim 1, wherein said (IV) polar polymer is ethylene-butyl acrylate, ethylene-ethyl acrylate, ethylene-methyl acrylate, ethylene-vinyl acetate, ethylene-vinyl acrylate, ethylene-vinyl alcohol, acrylonitrile-styrene-acrylate, styrene-acrylonitrile, styrene-maleic anhydride, meleated poly(styrene-ethylene-propylene-styrene), meleated poly(styrene-ethylene-butylene-styrene) or a mixture thereof.

4. A gel according to claim 1, wherein said selected (V) crystalline or non-crystalline polymer or copolymer is poly(styrene-butadiene-styrene), poly(styrene-butadiene), poly(styrene-isoprene-styrene), poly(styrene-isoprene), poly(styrene-ethylene-propylene), low viscosity poly(styrene-ethylene-propylene-styrene), low viscosity poly(styrene-ethylene-butylene-styrene), poly(styrene-ethylene-butylene), meleated poly(styrene-ethylene-butylene-styrene), high vinyl content poly(styrene-ethylene-butylene-styrene), poly(styrene-ethylene-propylene-styrene-ethylene-propylene), poly(ethylene-propylene), poly(styrene-butadiene)<sub>n</sub>, poly(styrene-butadiene)<sub>n</sub>, poly(styrene-isoprene)<sub>n</sub>, poly(styrene-isoprene)<sub>n</sub>, poly(styrene-ethylene-propylene)<sub>n</sub>, low viscosity poly(styrene-ethylene-propylene)<sub>n</sub>, low viscosity poly(styrene-ethylene-butylene)<sub>n</sub>, poly(styrene-ethylene-butylene)<sub>n</sub>, meleated poly(styrene-ethylene-butylene)<sub>n</sub>, high vinyl content poly(styrene-ethylene-butylene)<sub>n</sub>, poly(styrene-ethylene-propylene-styrene-ethylene-propylene)<sub>n</sub>, poly(ethylene-propylene)<sub>n</sub>, polystyrene, polybutylene, poly(ethylene-propylene), poly(ethylene-butylene), polypropylene, polyethylene, polyphthalamide or polyurethane elastomer formed from one or more saturated hydrocarbon diols, wherein said selected block copolymer is a linear, branched, multiarm, or star shaped copolymer.

5. A gel according to claim 1, wherein said (I) copolymer of said gel is a thermoplastic polyurethane elastomer made with diisocyanates and chain extenders 2,2,4-trimethyl-1,3-pentanediol or 2-Butyl-2-ethyl-1,3-pentanediol and a saturated hydrocarbon diol, said polyurethane having one or more crystalline groups of about 22% to about 45% by weight of said elastomer and capable of exhibiting a glass transition of at least about -40°C.

6. A gel according to claim 10, wherein said hydrocarbon diols is a hydroxyl terminated oligomer of poly(ethylene-butylene) or poly(ethylene-propylene).

7. A cold weather sock for footwear formed of a gel composite of claim 1, for direct contact with the foot and capable of substantially preventing the generation moisture from said foot.

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A cold weather footwear having an outer boot, a performed sock disposed in said boot and formed of a gel composite according to claim 1 for direct contact with the foot and capable of substantially preventing the generation moisture from said foot.

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A cold weather face mask for protection of the head, face, and neck areas against low temperatures and high wind velocities made from the gel composite of claim 1 for direct contact with the head, face, and neck and capable of substantially preventing the generation moisture from said head, face, and neck and having openings for insertion and removal of one or more hydrophilic patches in selected areas covered by said mask.

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10. A cold weather body suit for protection of the body areas against low temperatures and high wind velocities made from the gel composite of claim 1 for direct contact with the body and capable of substantially preventing the generation moisture from said body and having openings for insertion and removal of one or more hydrophilic patches in selected areas of the body covered by said suit.